

Sequence Listing

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15 <130> S-IPM-PAT/Dr. Re-kö - K1419 EP
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70 ZF0050330= Bacillus; ZF0051303= Bacterium; ZF0051337= Methylomonas;
75 ZF0051321= Bacterium; ZF0050782= Lactobacillus bulgaricus; ZF0050544= Phyllobacterium rubiacearum; ZF0002852= Rhodococcus; ZF0050310= Arthrobacter paraffineus; ZF0002862= Streptomyces clavuligerus; ZF0050292= Bacterium; ZF0002031= Streptomyces; ZF0002349= Streptomyces spectabilis; ZF0002434= Streptomyces; ZF0002437= Streptomyces; ZF0003712= Micromonospora; ZF0003765= Streptomyces; ZF0051305= Bacterium; ZF0003513= Actinomyces; ZF0050993= Kocuria; ZF0002018= Streptomyces; ZF0003767= Actinomyces; ZF0002332= Streptomyces diastatochromogenes; ZF0003768= Actinomyces; ZF0002379= Streptomyces coelescens; ZF0002351= Nonomuraea roseoviolacea; ZF0003769= Actinomyces;
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65 70 75 80

10 Lys Leu Arg Gly Gly Ser Tyr Ala Val Val Ile Gly Thr Gly Gly Leu
85 90 95

15 Gly His Val Ala Ile Gln Leu Leu Arg His Leu Ser Ala Ser Thr Val
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20 Ile Ala Leu Asp Val Ser Ala Asp Lys Leu Glu Leu Ala Thr Lys Val
115 120 125

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5 Thr Asp Ala Gly Leu Thr Pro Tyr His Ala Ile Lys Arg Ser Leu Gly
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10 Lys Leu Arg Ala Gly Ser Tyr Ala Val Val Ile Gly Thr Gly Gly Leu
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15 Gly His Val Gly Ile Gln Leu Leu Arg His Leu Ser Pro Ala Arg Ile
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20 Ile Ala Leu Asp Val Asn Asp Glu Lys Leu Ala Phe Ala Arg Glu Val
115 120 125

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	His Leu Val Pro Ile Gly Asp Leu Asp Pro Val Lys Thr Val Pro Leu
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	Thr Asp Ala Gly Leu Thr Pro Tyr His Ala Ile Lys Arg Ser Leu Pro
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Streptomyces; ZF0050993= Kocuria; ZF0002018= Streptomyces;

ZF0003767= Actinomyces; ZF0003764= Streptomyces; ZF0002331= Actinoplanes philippensis; ZF0002441= Streptomyces;

ZF0051307= Bacterium; ZF0051301= Bacterium; ZF0051240= Bacterium; ZF0002333= Rhodococcus erythropolis; ZF0003713=

Micromonospora; ZF0004980= Streptomyces; ZF0004821= Actinomyces; ZF0002359= Actinoplanes ianthinogenes; ZF0002396=

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 35 40 45

Ile Pro Ser Cys Gly Arg Cys Arg Trp Cys Ala Val Gly Gln Ser Asn
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 35 40 45

55 Ile Pro Ser Cys Gly Arg Cys Arg Trp Cys Ala Val Gly Gln Ser Asn
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Ile Pro Ser Cys Gly Arg Cys Arg Trp Cys Ala Val Gly Gln Ser Asn
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35 40 45

45 Ile Pro Ser Cys Gly Arg Cys Arg Trp Cys Ala Val Gly Gln Ser Asn
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40 Ile Pro Ser Cys Gly Arg Cys Arg Trp Cys Ala Val Gly Gln Ser Asn
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Gly Ile Val Arg Arg Pro Asp Pro Val Pro Cys Gly Ala Cys Ala His
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50 Gly Glu Phe Asp Met Cys Arg Asn Gly Glu Tyr Val Glu Arg Gly Ile
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55 Lys Gln Ile Asp Gly Tyr Gly Ser Thr Ser Trp Val Val Asp Ala Asp
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Tyr Thr Val Lys Leu Asp Pro Ala Leu Thr Glu Val Gly Val Leu Met

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	Gly Arg Arg His Leu Cys Arg Ala Thr Val Gly Leu Gly Val Gly Arg 65 70 75 80		
50	Asp Gly Ala Phe Ala Glu Tyr Val Val Leu Pro Ala Ser Asn Val Trp 85 90 95		
55	Val His Arg Val Pro Val Asp Leu Asp Val Ala Ala Ile Phe Asp Pro 100 105 110		
	Phe Gly Asn Ala Val His Thr Ala Leu Ser Phe Pro Leu Val Gly Glu		

115

120

125

5 Asp Val Leu Val Thr Gly Ala Gly Thr Ile Gly Ile
 130 135 140
 <210> 16
 <211> 138
 10 <212> PRT
 <213> unknown
 <220>
 15 <221> source
 <223> ZF0050197= Pseudomonas oleovorans; ZF0050294= Rhodococcus;
 ZF0050330= Bacillus, ZF0002852= Rhodococcus; ZF0050310= Arthrobacter paraffineus; ZF0002437= Streptomyces; ZF0003712= Micromonospora; ZF0003765= Streptomyces; ZF0002332= Streptomyces diatsatochromogenes; ZF0003768= Actinomyces; ZF0002379= Streptomyces coelescens; ZF0002443= Streptomyces; ZF0002442= Streptomyces; ZF0002436= Streptomyces; ZF0050994= Bacterium; ZF0050992= Bacterium; ZF0050442= Bacterium; ZF0002049= Streptomyces; ZF0006069= Streptomyces; ZF0006075= Streptomyces; ZF0004724= Nocardiaform; ZF0002392= Actinoplanes nippensis; ZF0002356= Actinoplanes brasiliensis; ZF0003501= Actinomyces; ZF0051322= Bacterium; ZF0006078= Streptomyces; ZF0006092= Streptomyces; ZF0006090= Streptomyces; ZF0006084= Streptomyces; ZF0006068= Streptomyces; ZF0050284= Rhodococcus; ZF0050028= Agrobacterium tumefaciens; ZF0003540= Actinomyces; ZF0003528= Actinomyces; ZF0003529= Actinomyces;
 20 <400> 16
 30 Gly Leu Thr Ile Gly His Glu Pro Val Gly Val Ile Glu Lys Leu Gly
 1 5 10 15
 40 Ser Ala Val Thr Gly Tyr Arg Glu Gly Gln Arg Val Ile Ala Gly Ala
 20 25 30
 45 Ile Cys Pro Asn Phe Asn Ser Tyr Ala Ala Gln Asp Gly Ala Pro Ser
 35 40 45
 50 Gln Asp Gly Ser Tyr Leu Val Ala Ser Gly Ala Cys Gly Cys His Gly
 55 55 60
 50
 55 Tyr Arg Ala Thr Ala Gly Trp Arg Phe Gly Asn Ile Ile Asp Gly Ala
 65 70 75 80
 55 Gln Ala Glu Tyr Leu Leu Val Pro Asp Ala Gln Gly Asn Leu Ala Pro
 85 90 95

Val Pro Asp Asn Leu Ser Asp Glu Gln Val Leu Met Cys Pro Asp Ile
 100 105 110

5

Met Ser Thr Gly Phe Lys Gly Ala Glu Asn Ala His Ile Arg Ile Gly
 115 120 125

10 Asp Thr Val Ala Val Phe Ala Gln Gly Pro
 130 135

15 <210> 17

<211> 144

<212> PRT

20 <213> unknown

<220>

25 <221> source

<223> ZF0050197= Pseudomonas oleovorans; ZF0050294= Rhodococcus;
 ZF0050330= Bacillus, ZF0002852= Rhodococcus; ZF0050310= Arthrobacter paraffineus; ZF0002437= Streptomyces; ZF0003712= Micromonospora; ZF0003765= Streptomyces; ZF0002332= Streptomyces diatsatochromogenes; ZF0003768= Actinomyces; ZF0002379= Streptomyces coelescens; ZF0002443= Streptomyces; ZF0002442= Streptomyces; ZF0002436= Streptomyces; ZF0050994= Bacterium; ZF0050992= Bacterium; ZF0050442= Bacterium; ZF0002049= Streptomyces; ZF0006069= Streptomyces; ZF0006075= Streptomyces; ZF0004724= Nocardiaform; ZF0002392= Actinoplanes nipponensis; ZF0002356= Actinoplanes brasiliensis; ZF0003501= Actinomyces; ZF0051322= Bacterium; ZF0006078= Streptomyces; ZF0006092= Streptomyces; ZF0006090= Streptomyces; ZF0006084= Streptomyces; ZF0006068= Streptomyces; ZF0050284= Rhodococcus; ZF0050028= Agrobacterium tumefaciens; ZF0003540= Actinomyces; ZF0003528= Actinomyces; ZF0003529= Actinomyces;

40 <400> 17

45 Cys Gly Thr Asp Leu His Ile Leu Gly Gly Asp Val Pro Glu Val Thr
 1 5 10 15

Asp Gly Arg Ile Leu Gly His Glu Ala Val Gly Thr Val Val Glu Val
 20 25 30

50

Gly Asp Gly Val Gln Thr Leu Ala Pro Gly Asp Arg Val Leu Val Ser
 35 40 45

55

Cys Val Thr Ala Cys Gly Thr Cys Arg Phe Cys Arg Glu Ser Arg Tyr
 50 55 60

Gly Gln Cys Leu Gly Gly Gly Trp Ile Leu Gly His Leu Ile Asp
65 70 75 80

5

Gly Thr Gln Ala Glu Leu Val Arg Val Pro Tyr Ala Asp Asn Ser Thr
85 90 95

10 His Arg Ile Pro Asp Gly Val Ser Asp Glu Gln Met Leu Met Leu Ala
100 105 110

15 Asp Ile Leu Pro Thr Ser Tyr Glu Val Gly Val Leu Asn Gly Cys Leu
115 120 125

20 Arg Pro Ala Asp Val Val Ile Ile Gly Ala Asp Asp Arg Pro Leu
130 135 140

<210> 18

<211> 73

25 <212> PRT

<213> unknown

30 <220>

<221> source

<223> ZF0050310= Arthrobacter paraffineus

35 <400> 18

Val Asp Val Val Val Asp Asn Ala Gly Phe Gly Thr His Gly Ala Phe
1 5 10 15

40

Val Asp Glu Asp His Glu Arg Val Thr Ser Glu Ile Gln Leu Asn Ile
20 25 30

45 Ala Thr Leu Val Glu Leu Thr His Thr Phe Pro Pro Asp Leu Leu Thr
35 40 45

Gly Arg Gly Ala Leu Val Asn Ile Ala Ser Thr Ala Ser Phe Gln Pro
50 55 60

5 Thr Pro Gly Met Ala Val Tyr Cys Ala
65 70

10 <210> 19

<211> 75

<212> PRT

15 <213> unknown

<220>

20 <221> source

<223> ZF0050310= *Arthrobacter paraffineus*

<400> 19

25 Val Asp Val Val Val His Asn Ala Gly Phe Gly Thr His Gly Ala Phe
1 5 10 15

30 Val Asp Glu Asp Leu Glu Arg Val Thr Ser Glu Ile Gln Leu Asn Ile
20 25 30

35 Ala Thr Leu Val Glu Leu Thr His Thr Phe Leu Pro Asp Leu Leu Thr
35 40 45

40 Gly Arg Gly Ala Leu Val Asn Ile Ala Ser Thr Ala Ser Phe Gln Pro
50 55 60

45 Thr Pro Gly Met Ala Val Tyr Cys Ala Thr Lys
65 70 75

<210> 20

<211> 79

<212> PRT

50 <213> unknown

<220>

55 <221> source

<223> ZF0003535= *Actinomyces*

<400> 20

Arg Val Asp Val Val Val His Asn Ala Ala Ile Thr Gln Lys Ala Thr

1

5

10

15

5 Phe Arg Asp Ile Thr Pro Ala Asp Phe Glu Arg Ile Leu Arg Val Asn
20 25 30

10 Leu Thr Gly Val Phe Asn Leu Ser Gln Ala Val Ile Pro Leu Met Ile
35 40 45

15 Gln Arg Gly Gly Ser Ile Val Ser Ile Ser Ser Leu Ser Ala Gln
50 55 60

15

Asn Gly Gly Ile Phe Gly Gly Ala His Tyr Cys Ala Thr Lys
65 70 75

20

<210> 21

<211> 76

25

<212> PRT

<213> unknown

<220>

30

<221> source

<223> ZF0003535= Actinomyces

35

<400> 21
35 Val Asp Val Val Val Asp Asn Ala Gly Leu Ala Leu Gly Thr Ala Pro
1 5 10 15

40

Ala Pro Gln Val Pro Leu Lys Asp Trp Gln Thr Met Val Asn Thr Asn
20 25 30

45

Ile Thr Gly Leu Leu Asn Ile Thr His His Leu Leu Pro Thr Leu Ile
35 40 45

50

Asp Arg Lys Gly Ile Val Val Asn Leu Ser Ser Val Ala Ala His Tyr
50 55 60

Pro Tyr Thr Gly Gly Asn Val Tyr Cys Ala Ser Lys
65 70 75

55

<210> 22

<211> 72

<212> PRT

<213> unknown

5 <220>

<221> source

<223> ZF0050310= Arthrobacter paraffineus

10 <400> 22

Gln Gly Ile Gly Tyr Ala Thr Ala Lys Arg Leu Ile Ser Leu Gly Ala
1 5 10 15

15

Thr Val Ala Ile Gly Asp Ile Asp Glu Ala Thr Leu Ala Arg Ala Ala
20 25 30

20

Lys Asp Leu Gly Ile Arg Thr Phe Gly Arg Leu Asp Val Thr Asp Pro
35 40 45

25

Ala Ser Phe Phe Asp Phe Leu Asp Thr Val Glu Gly Glu Leu Gly Pro
50 55 60

30

Ile Asp Val Leu Ile Asn Asn Ala
65 70

<210> 23

35 <211> 75

<212> PRT

40 <213> unknown

<220>

<221> source

<223> ZF0050310= Arthrobacter paraffineus

45 <400> 23

Gln Arg Ile Gly Leu Glu Ile Ala Arg Thr Phe Ile Lys Glu Gly Ala
1 5 10 15

50

Thr Val Val Leu Gly Asp Ile Asn Glu Thr Val Gly Thr Ala Ala Val
20 25 30

55

Ala Glu Leu Gly Gly Glu Ser Val Ala Arg Phe Ala Ser Cys Asp Val
35 40 45

Arg Asp Ser Gly Gln Val Glu Ala Met Leu Asp Leu Ala Glu Ser Ala
50 55 60

5 Phe Gly Pro Val Asp Val Met Met Asn Asn Ala
65 70 75

10 <210> 24

<211> 72

<212> PRT

15 <213> unknown

<220>

20 <221> source

<223> ZF0050310= *Arthrobacter paraffineus*

<400> 24

25 Gln Gly Ile Gly Tyr Gln Thr Ala Lys Glu Leu Ile Arg Arg Gly His
1 5 10 15

Arg Val Ala Ile Gly Asp Ile Asp Glu Ala Arg Ala Lys Glu Thr Ala
20 25 30

30

Ala Glu Leu Gly Val Lys Val Val Thr Arg Leu Asp Val Thr Asp Pro
35 40 45

35

Asp Ser Phe Lys Asp Phe Leu Asp Leu Val Glu Gly Asp Leu Gly Pro
50 55 60

40 Leu Asp Val Leu Ile Asn Asn Ala
65 70

45 <210> 25

<211> 74

<212> PRT

50 <213> unknown

<220>

55 <221> source

<223> ZF0050310= *Arthrobacter paraffineus*

<400> 25

Gly Ile Gly Leu Glu Ile Ala Arg Thr Phe Ile Lys Glu Gly Ala Thr
1 5 10 15

5 Val Val Leu Gly Asp Ile Asn Glu Thr Val Gly Thr Ala Ala Val Ala
20 25 30

10 Glu Leu Gly Gly Glu Ser Val Ala Arg Phe Ala Ser Cys Asp Val Arg
35 40 45

15 Asp Ser Gly Gln Val Glu Ala Met Leu Asp Leu Ala Glu Ser Ala Phe
50 55 60

20 Gly Pro Val Asp Val Ile Val Asn Asn Ala
65 70

25 <210> 26

<211> 74

<212> PRT

<213> unknown

30 <220>

<221> source

<223> ZF0050310= Arthrobacter paraffineus

35 <400> 26

Ile Gly Leu Glu Ile Ala Arg Thr Phe Ile Lys Glu Gly Ala Thr Val
1 5 10 15

40 Val Leu Gly Asp Ile Asn Glu Thr Val Gly Thr Ala Ala Val Gly Glu
20 25 30

45 Leu Gly Gly Glu Ser Val Ala Arg Phe Ala Ser Cys Asp Val Arg Asp
35 40 45

50 Ser Gly Gln Val Glu Ala Met Leu Asp Leu Ala Glu Ser Ala Phe Gly
50 55 60

55 Pro Val Asp Val Met Val Asn Asn Ala Gly
65 70

<210> 27

<211> 62

5 <212> PRT

10 <213> unknown

15 <220>

20 <221> source

25 <223> ZF0002333= Rhodococcus erythropolis

30 <400> 27

35 Val Pro Val Ala Val Val Asp Leu His Ile Glu Ser Ala Lys Glu Thr
1 5 10 15

40 15

45 Val Ala Leu Ile Glu Ser Gln Tyr Gly Thr Pro Ala Leu Ala Leu Glu
20 25 30

50 20

55 Ala Asp Val Arg Asp Arg Ala Ala Val Ser Ala Ala Phe Glu Ala Thr
35 40 45

60 25

65 Val Ala Glu Trp Gly Arg Phe Asp Tyr Leu Val Asn Asn Ala
50 55 60

70 30

75 <210> 28

80 <211> 74

85 <212> PRT

90 35

95 <213> unknown

100 <220>

105 40

110 <221> source

115 <223> ZF0002333= Rhodococcus erythropolis

120 <400> 28

125 45

130 Leu Gly Arg Glu Ile Ala Leu Lys Leu Ala Ser Glu Gly Ala Ser Val
1 5 10 15

135 50

140 Val Val Asn Asp Leu Asp Pro Glu Pro Ala Ala Gln Thr Glu Arg Asp
20 25 30

145 55

150 Ile Lys Ala Thr Gly Gly Gln Ala Val Ser Cys Val Gly Ser Val Ala
35 40 45

155 50 55 60

Gly Gly Leu Asp Val Met Val Asn Asn Ala
65 70

5 <210> 29
<211> 76
10 <212> PRT
<213> unknown
<220>
15 <221> source
<223> ZF0002333= Rhodococcus erythropolis
<400> 29
20 Ala Gly Leu Gly Val Glu Phe Ala His Arg Phe Ala Ala Arg Gly Ala
1 5 10 15
25 Asn Leu Val Leu Val Ala Arg Arg Ala Asp Arg Leu Glu Ala Leu Ala
20 25 30
30 Thr Glu Leu Arg Val Ala His Gly Ile Thr Val Thr Val Leu Pro Ala
35 35 40 45
Asp Leu Ala Ala Pro Gly Val Gly Ala Thr Leu His Gln Glu Leu Thr
50 55 60
35 Ser Arg Gly Ile Thr Val Thr Ser Leu Ile Asn Asn
65 70 75
40 <210> 30
<211> 72
45 <212> PRT
<213> unknown
<220>
50 <221> source
<223> ZF0003535= Actinomyces
<400> 30
55 Pro Ala Asp Gly Tyr Gln Thr Ala Lys Glu Leu Ile Arg Arg Gly His
1 5 10 15

Arg Val Ala Ile Val Asp Ile Asp Glu Ala Arg Ala Lys Gly Ala Ala
20 25 30

5 Ala Glu Leu Gly Val Lys Val Val Thr Arg Leu Asp Val Thr Glu Pro
35 40 45

10 Asp Ser Phe Thr Thr Phe Leu Asp Leu Val Glu Arg Glu Leu Gly Pro
50 55 60

Leu Asp Ile Leu Val Asn Asn Ala
65 70

15

<210> 31

<211> 67

20

<212> PRT

<213> unknown

25

<220>

<221> source

<223> ZF0050310= *Arthrobacter paraffineus*

30

<400> 31

Ala Thr Asp Gly Ala Arg Val Ala Val Val Asp Leu His Ile Glu Ser
1 5 10 15

35

Ala Glu Glu Thr Val Ala Leu Ile Glu Ser Gln Tyr Gly Thr Pro Ala
20 25 30

40

Leu Ala Leu Glu Ala Asp Val Arg Asp Arg Ala Ala Val Ser Ala Ala
35 40 45

45

Phe Glu Ala Thr Val Ala Glu Trp Gly Arg Phe Asp Tyr Leu Val Asn
50 55 60

50

Asn Ala Gly
65

<210> 32

<211> 67

55

<212> PRT

<213> unknown

<220>

<221> source

<223> ZF0050310= Arthrobacter paraffineus

5

<400> 32

Ala Ala Asp Gly Ala Arg Val Ala Val Val Asp Leu His Ile Glu Ser
1 5 10 15

10

Ala Lys Glu Thr Val Ala Leu Ile Glu Ser Gln Tyr Gly Thr Pro Ala
20 25 30

15

Leu Ala Leu Glu Ala Asp Val Arg Asp Arg Ala Ala Val Ser Ala Ala
35 40 45Phe Glu Ala Thr Val Ala Glu Trp Gly Arg Phe Asp Tyr Leu Val Asn
50 55 60

20

Asn Ala Gly
65

25

<210> 33

<211> 348

30

<212> PRT

<213> unknown

<220>

35

<221> source

<223> ZF0050310= Arthrobacter paraffineus

40

<400> 33
Met Lys Ala Ile Gln Tyr Ala Arg Ile Gly Ala Glu Pro Glu Leu Thr
1 5 10 15

40

45

Glu Ile Pro Lys Pro Glu Pro Gly Pro Gly Glu Val Leu Leu Glu Val
20 25 30

50

Thr Ala Ala Gly Val Cys His Ser Asp Asp Phe Ile Met Ser Leu Pro
35 40 45

55

Glu Glu Gln Tyr Thr Tyr Gly Leu Pro Leu Thr Leu Gly His Glu Gly
50 55 60Ala Gly Arg Val Ala Ala Val Gly Glu Gly Val Glu Gly Leu Asp Ile
65 70 75 80

Gly Thr Asn Val Val Val Tyr Gly Pro Trp Gly Cys Gly Ser Cys Trp
 85 90 95

5 His Cys Ser Gln Gly Leu Glu Asn Tyr Cys Ser Arg Ala Lys Glu Leu
 100 105 110

10 Gly Ile Asn Pro Pro Gly Leu Gly Ala Pro Gly Ala Leu Ala Glu Phe
 115 120 125

15 Met Ile Val Asp Ser Pro Arg His Leu Val Pro Ile Gly Asp Leu Asp
 130 135 140

20 Pro Val Lys Thr Val Pro Leu Thr Asp Ala Gly Leu Thr Pro Tyr His
 145 150 155 160

Ala Ile Lys Arg Ser Leu Pro Lys Leu Arg Gly Gly Ala Tyr Ala Val
 165 170 175

25 Val Ile Gly Thr Gly Leu Gly His Val Ala Ile Gln Leu Leu Arg
 180 185 190

30 His Leu Ser Ala Ala Thr Val Ile Ala Leu Asp Val Ser Ala Asp Lys
 195 200 205

35 Leu Glu Leu Ala Thr Lys Val Gly Ala His Glu Val Val Leu Ser Asp
 210 215 220

40 Lys Asp Ala Ala Glu Asn Val Arg Arg Ile Thr Gly Ser Gln Gly Ala
 225 230 235 240

Ala Leu Val Leu Asp Phe Val Gly Tyr Gln Pro Thr Ile Asp Thr Ala
 245 250 255

45 Met Ala Val Ala Gly Val Gly Ser Asp Val Thr Ile Val Gly Ile Gly
 260 265 270

50 Asp Gly Gln Ala His Ala Lys Val Gly Phe Phe Gln Ser Pro Tyr Glu
 275 280 285

55 Ala Ser Val Thr Val Pro Tyr Trp Gly Ala Arg Asn Glu Leu Ile Glu
 290 295 300

Leu Ile Asp Leu Ala His Ala Gly Ile Phe Asp Ile Ala Val Glu Thr
 305 310 315 320

Phe Ser Leu Asp Asn Gly Ala Glu Ala Tyr Arg Arg Leu Ala Ala Gly
325 330 335

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Thr Leu Ser Gly Arg Ala Val Val Val Pro Gly Leu
340 345

10 <210> 34

<211> 348

15 <212> PRT

<213> unknown

<220>

20 <221> source
<223> ZF0050310= Arthrobacter paraffineus

<400> 34

25 Met Lys Ala Ile Gln Tyr Thr Arg Ile Gly Ala Glu Pro Glu Leu Thr
1 5 10 15

30 Glu Ile Pro Lys Pro Glu Pro Gly Pro Gly Glu Val Leu Leu Glu Val
20 25 30

35 Thr Ala Ala Gly Val Cys His Ser Asp Asp Phe Ile Met Ser Leu Pro
35 40 45

40 Glu Glu Gln Tyr Thr Tyr Gly Leu Pro Leu Thr Leu Gly His Glu Gly
50 55 60

45 Ala Gly Arg Val Ala Ala Val Gly Glu Gly Val Glu Gly Leu Asp Ile
65 70 75 80

50 Gly Thr Asn Val Val Val Tyr Gly Pro Trp Gly Cys Gly Ser Cys Trp
85 90 95

His Cys Ser Gln Gly Leu Glu Asn Tyr Cys Ser Arg Ala Lys Glu Leu
100 105 110

Gly Ile Asn Pro Pro Gly Leu Gly Ala Pro Gly Ala Leu Ala Glu Phe
 115 120 125

5 Met Ile Val Asp Ser Pro Arg His Leu Val Pro Ile Gly Asp Leu Asp
 130 135 140

10 Pro Val Lys Thr Val Pro Leu Thr Asp Ala Gly Leu Thr Pro Tyr His
 145 150 155 160

Ala Ile Lys Arg Ser Leu Pro Lys Leu Arg Gly Gly Ala Tyr Ala Val
 165 170 175

15

Val Ile Gly Thr Gly Leu Gly His Val Ala Ile Gln Leu Leu Arg
 180 185 190

20

His Leu Ser Ala Ala Thr Val Ile Ala Leu Asp Val Ser Ala Asp Lys
 195 200 205

25

Leu Glu Leu Ala Thr Lys Val Gly Ala His Glu Val Val Leu Ser Asp
 210 215 220

30

Lys Asp Ala Ala Glu Asn Val Arg Arg Ile Thr Gly Ser Gln Gly Ala
 225 230 235 240

Ala Leu Val Leu Asp Phe Val Gly Tyr Gln Pro Thr Ile Asp Thr Ala
 245 250 255

35

Met Ala Val Ala Gly Val Gly Ser Asp Val Thr Ile Val Gly Ile Gly
 260 265 270

40

Asp Gly Gln Ala His Ala Lys Val Gly Phe Phe Gln Ser Pro Tyr Glu
 275 280 285

45

Ala Ser Val Thr Val Pro Tyr Trp Gly Ala Arg Asn Glu Leu Ile Glu
 290 295 300

50

Leu Ile Asp Leu Ala His Ala Gly Ile Phe Asp Ile Ala Val Glu Thr
 305 310 315 320

Phe Ser Leu Asp Asn Gly Ala Glu Ala Tyr Arg Arg Leu Ala Ala Gly
 325 330 335

55

Thr Leu Ser Gly Arg Ala Val Val Val Pro Gly Leu
 340 345

150
5 <210> 35
<211> 488
<212> DNA
<213> unknown
10 10 <220>
<221> source
<223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0050197= *Pseudomonas oleovorans*; ZF0050294= *Rhodococcus*;
ZF0050330= *Bacillus*; ZF0051303= *Bacterium*; ZF0051337= *Methylomonas*; ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*; ZF0050544= *Phyllobacterium rubiacearum*; ZF0002852= *Rhodococcus*; ZF0050310= *Arthrobacter paraffineus*; ZF0002862= *Streptomyces clavuligerus*; ZF0050292= *Bacterium*; ZF0002031= *Streptomyces*; ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*; ZF0002437= *Streptomyces*; ZF0003712= *Micromonospora*; ZF0003765= *Streptomyces*; ZF0051305= *Bacterium*; ZF0003513= *Actinomyces*; ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*; ZF0003767= *Actinomyces*; ZF0002332= *Streptomyces diastatochromogenes*; ZF0003768= *Actinomyces*; ZF0002379= *Streptomyces coelescens*; ZF0002351= *Nonomuraea roseoviolacea*; ZF0003769= *Actinomyces*;
20 <400> 35
30 30 gggccatggg gttgtggcaa ctgttggcac tgctcacaag gactcgagaa ctattgctct
60
120 cgcgcccaag aactcgaaat caatcctccc ggtctcggtg caccggcgc gttggccgag
35 35 ttcatgatcg tcgattctcc tcgcccacctt gtcccgatcg gtgacacctga cccggtaaag
180
40 40 acggtgccgc tgaccgacgc cggcttgacg ccgtatcacg cgatcaagcg ttctctgccg
240
300 aaacttcgacg gaggctcgta cgccgttgcg attggtaaccg gcgggctcgg ccacgtcgcc
45 45 attcagctcc tccgtcacct ctggcgatca acggtcatcg ctttggacgt gagcgcggac
360
420 aagctcgaac tggcaaccaa ggtaggcgct cacgaagtgg ttctgtccga caaggacgcg
50 50 gcccggaaacg tccgcaagat cactggaagt caaggcgccg cactggttct cgacttcgtt
480
55 55 ggctacca
488
<210> 36

<211> 385
<212> DNA
5 <213> unknown
<220>
<221> source
10 <223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0050197= *Pseudomonas oleovorans*; ZF0050294= *Rhodococcus*;
ZF0050330= *Bacillus*; ZF0051303= *Bacterium*; ZF0051337= *Methylomonas*;
ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*; ZF0050544= *Phyllobacterium rubiacearum*; ZF0002852= *Rhodococcus*; ZF0050310= *Arthrobacter paraffineus*; ZF0002862= *Streptomyces clavuligerus*; ZF0050292= *Bacterium*; ZF0002031= *Streptomyces*; ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*; ZF0002437= *Streptomyces*; ZF0003712= *Micromonospora*; ZF0003765= *Streptomyces*; ZF0051305= *Bacterium*;
20 ZF0003513= *Actinomyces*; ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*; ZF0003767= *Actinomyces*; ZF0002332= *Streptomyces diastatochromogenes*; ZF0003768= *Actinomyces*; ZF0002379= *Streptomyces coelescens*; ZF0002351= *Nonomuraea roseoviolacea*; ZF0003769= *Actinomyces*;
25 <400> 36
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60
cgcgcccaag aactcgaaat caatcctccc ggtctcggtg caccggcgca gttggccgag
30 120
ttcatgatcg tcgattctcc tcgccacctt gtcccgatcg gtgacctcga cccggtaag
180
35 acggtgccgc tgaccgacgc cggctcgacg ccgtatcagc cgatcaagcg ttctctgccg
240
aaacttcgca gaggctcgta cgcggttgtc attggtaaccg gcgggctcgg ccacgtcacc
300
40 attcagctcc tccgtcacct ctcggcggca acggtcatcg ctggacgt gagcgcggac
360
aagctcgaaac tggcaaccaa ggtac
45 385

<210> 37
50 <211> 486
<212> DNA
<213> unknown
55 <220>
<221> source
<223> ZF0050286= *Corynebacterium hoagii*

<400> 37
ggcccttggg gttgcggacg ttgctggcac tgcgcgagg ggctcgagaa ctactgctcc
60

5 cgcgcaaggg aactcgccat cgccccaccc ggcttggcgcg cgccggcgc gatcgccgag
120

10 tacatgatcg tcgactcgcc gcgtcacctg gtcccgtatcg gtgacacctga ccccgtaacg
180

acggtgccgc tgaccgacgc cgggctcacc ccgtaccacg cgatcaaacg gtcgctcggc
240

15 aagctccgcg ccggctcgta cgcaagtgcgt atcggcaccg gaggcctcgg acacgtcggc
300

atccagctgc tccgcccacct gtcccctgca cgcatcatcg ccctcgacgt caacgacgag
360

20 aagctcgct tcgccccgca ggtcgccgcg cacgagaccg tttgtcgaa cgccgacgccc
420

25 gccgcgaacg tccggaagat cacgggttcg gccgggtgcgcg cgctggtcct agacttcgtc
480

ggctac
486

30 <210> 38

<211> 483

35 <212> DNA

<213> unknown

<220>

40 <221> source
<223> ZF0050310= *Arthrobacter paraffineus*

<400> 38

45 ggccatggg gctgtggcag ctgttggcac tgctcgcaag gactcgaaaa ctactgttct
60

cgggcaaaag aactcgccat caatcctcct ggtctcggtg cacccggcgc gttggccgaa
120

50 ttcatgatcg tcgattcacc tcgcccacctc gtcccgtatcg ggcacacctga tccggtaag
180

55 acggtgccac tgaccgacgc cggctcgact ccgtatcaccg cgatcaagcg ttcactgccc
240

aaacttcgcg gtggcgcgta cgccgtcgta atcggtaccg gcggtctcgg ccatgtcgcc
300

atccaaactcc tccgccacct ctcggcagca accgtcatcg cactcgacgt gagcgcggac
360

aagctcgtac tggcaaccaa ggtaggcgct cacgaagtgg tcctgtccga caaggacgac
5 420

gccgagaacg tccgcaggat caccggaagt cagggcgccg cactggttct tgacttcgtt
480

10 ggc
483

15 <210> 39

<211> 210

<212> DNA

20 <213> unknown

<220>

25 <221> source

<223> ZF0004210= Actinomyces; ZF0004212= Actinomyces; ZF0004211= Actinomyces; ZF0003860= Actinomyces; ZF0004218= Actinomyces; ZF0003868= Actinomadura; ZF0004213= Actinomyces; ZF0003876= Actinomyces; ZF0003866= Actinomyces; ZF0003864= Actinomyces; ZF0003862= Actinomadura; ZF0003869= Actinomyces; ZF0003867= Actinomadura; ZF0004216= Actinomyces; ZF0004235= Actinomyces; ZF0004209= Actinomadura; ZF0004214= Actinomyces; ZF0003871= Actinomyces; ZF0004063= Actinomadura; ZF0004052= Actinomadura; ZF0006405= Streptomyces; ZF0003865= Actinomadura; ZF0004047= Actinomadura; ZF0004070= Actinomyces; ZF0004085= Actinomyces; ZF0004217= Actinomyces; ZF0004089= Actinomadura; ZF0004090= Actinomadura; ZF0006138= Streptomyces; ZF0004236= Actinomadura; ZF0051203= Bacterium;

35

40 <400> 39

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60

cgccccaagg aactcggcat cgccccgccc ggactcggct cgcccgccgc catggccgag
120

45 tacatgatcg tcgacgaccc gcccacctg gtgccgctcg gcggtctcga cccggtccag
180

50 gccgtgccgc tcactgacgc gggcctgaca
210

<210> 40

55 <211> 282

<212> DNA

<213> unknown

<220>

<221> source

5 <223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*;
ZF0050544= *Phyllobacterium rubiacearum*; ZF0002031= *Streptomyces*;
ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*;
ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*;
10 ZF0003767= *Actinomyces*; ZF0003764= *Streptomyces*; ZF0002331= *Actinoplanes philippensis*; ZF0002441= *Streptomyces*;
ZF0051307= *Bacterium*; ZF0051301= *Bacterium*; ZF0051240= *Bacterium*;
ZF0002333= *Rhodococcus erythropolis*; ZF0003713= *Micromonospora*; ZF0004980= *Streptomyces*; ZF0004821= *Actinomyces*;
15 ZF0002359= *Actinoplanes ianthinogenes*; ZF0002396= *Actinoplanes*; ZF0003781= *Actinomyces*; ZF0003512= *Actinomyces*;
ZF0006093= *Streptomyces*; ZF0006103= *Streptomyces*; ZF0006087= *Streptomyces*; ZF0050446= *Bacterium*; ZF0050445= *Bacterium*;
ZF0006086= *Streptomyces*; ZF0002322= *Rhodococcus*; ZF0003538= *Actinomyces*;
20 ZF0003535= *Actinomyces*;

<400> 40

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6025 ggcgggcacg agggttcggg cgtcatcacc aagctcggcc ctgaggtcaa gggactggag
12030 gtcggcgacc acgtcgttct gtccttcatt ccggcttgcgtt gAACCTGTCC ggcgtgttcg
180gccgggcacg agaatcttg tgacacctggg atgggcctcc tcagcggcca agccatcagc
24035 gacggcacgt accggatcca ggctcgcggc gaaaacgtga tc
282

<210> 41

40 <211> 276

<212> DNA

45 <213> unknown

<220>

<221> source

50 <223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*;
ZF0050544= *Phyllobacterium rubiacearum*; ZF0002031= *Streptomyces*;
ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*;
ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*;
ZF0003767= *Actinomyces*; ZF0003764= *Streptomyces*; ZF0002331= *Actinoplanes philippensis*; ZF0002441= *Streptomyces*;
ZF0051307= *Bacterium*; ZF0051301= *Bacterium*; ZF0051240= *Bacterium*;
ZF0002333= *Rhodococcus erythropolis*; ZF0003713= *Micromonospora*; ZF0004980= *Streptomyces*; ZF0004821=

Actinomyces; ZF0002359= Actinoplanes ianthinogenes; ZF0002396= Actinoplanes; ZF0003781= Actinomyces; ZF0003512= Actinomyces; ZF0006093= Streptomyces; ZF0006103= Streptomyces; ZF0006087= Streptomyces; ZF0050446= Bacterium; ZF0050445= Bacterium; 5 ZF0006086= Streptomyces; ZF0002322= Rhodococcus; ZF0003538= Actinomyces; ZF0003535= Actinomyces;

<400> 41
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 ggccacgaag ggcgcggcat agtggagaaa gtcggcccg gcgtgcgaga cgtcgaggta
 120
 15 ggcgatcacg tcgtcctctc cttcattccc tcgtgtggac gctgccgttgcgtgcagtc
 180
 ggacagagca acctctgcga cctcggcgcc attctgatgg ccggcgcaca ggtcgacggg
 240
 20 acgtaccgcg cgacagctcg cgggcacgac gtcgga
 276
 <210> 42
 25 <211> 276
 <212> DNA
 <213> unknown
 30 <220>
 <221> source
 <223> ZF0002326= Actinoplanes missouriensis; ZF0003505= Streptomyces; 35 ZF0051321= Bacterium; ZF0050782= Lactobacillus bulgaricus; ZF0050544= Phyllobacterium rubiacearum; ZF0002031= Streptomyces; ZF0002349= Streptomyces spectabilis; ZF0002434= Streptomyces; ZF0050993= Kocuria; ZF0002018= Streptomyces; ZF0003767= Actinomyces; ZF0003764= Streptomyces; ZF0002331= Actinoplanes philippinensis; ZF0002441= Streptomyces; 40 ZF0051307= Bacterium; ZF0051301= Bacterium; ZF0051240= Bacterium; ZF0002333= Rhodococcus erythropolis; ZF0003713= Micromonospora; ZF0004980= Streptomyces; ZF0004821= Actinomyces; ZF0002359= Actinoplanes ianthinogenes; ZF0002396= Actinoplanes; ZF0003781= Actinomyces; ZF0003512= Actinomyces; 45 ZF0006093= Streptomyces; ZF0006103= Streptomyces; ZF0006087= Streptomyces; ZF0050446= Bacterium; ZF0050445= Bacterium; ZF0006086= Streptomyces; ZF0002322= Rhodococcus; ZF0003538= Actinomyces; ZF0003535= Actinomyces;
 50 <400> 42
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 60
 ggccacgaag ggcgcggcat agtggagaaa gtcggcccg gcgtgcgaga cgtcgaggta
 120
 55 ggcgatcacg tcgtcctctc cttcattccc tcgtgtggac gctgccgttgcgtgcagtc
 180

ggacagagca acctctgcga cctcggcgcc attctgatgg ccggcgcaca ggtcgacggg
240

5 acgtaccgcg cgacagctcg cgggcacgac gtcgga
276

10 <210> 43
<211> 276
<212> DNA

15 <213> unknown

<220>

<221> source
20 <223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*;
ZF0050544= *Phyllobacterium rubiacearum*; ZF0002031= *Streptomyces*;
ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*;
ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*;
25 ZF0003767= *Actinomyces*; ZF0003764= *Streptomyces*; ZF0002331= *Actinoplanes philippinensis*; ZF0002441= *Streptomyces*;
ZF0051307= *Bacterium*; ZF0051301= *Bacterium*; ZF0051240= *Bacterium*; ZF0002333= *Rhodococcus erythropolis*; ZF0003713= *Micromonospora*; ZF0004980= *Streptomyces*; ZF0004821= *Actinomyces*; ZF0002359= *Actinoplanes ianthinogenes*; ZF0002396= *Actinoplanes*; ZF0003781= *Actinomyces*; ZF0003512= *Actinomyces*; ZF0006093= *Streptomyces*; ZF0006103= *Streptomyces*; ZF0006087= *Streptomyces*; ZF0050446= *Bacterium*; ZF0050445= *Bacterium*;
30 ZF0006086= *Streptomyces*; ZF0002322= *Rhodococcus*; ZF0003538= *Actinomyces*; ZF0003535= *Actinomyces*;

<400> 43
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40 ggccacgaag ggcgcggcat agtggagaaa gtcggccccc gcgtgcgaga cgtcgaggta
120

45 ggcgatcacg tcgtcctctc cttcattccc tcgtgtggac gctgccgttgcgtcgac
180

ggacagagca acctctgcga cctcggcgcc attctgatgg ccggcgcaca ggtcgacggg
240

50 acgtaccgcg cgacagctcg cgggcacgac gtcgga
276

55 <210> 44
<211> 276
<212> DNA

<213> unknown

<220>

5 <223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*;
ZF0050544= *Phyllobacterium rubiacearum*; ZF0002031= *Streptomyces*;
ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*;
ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*;
10 ZF0003767= *Actinomyces*; ZF0003764= *Streptomyces*; ZF0002331= *Actinoplanes philippensis*; ZF0002441= *Streptomyces*;
ZF0051307= *Bacterium*; ZF0051301= *Bacterium*; ZF0051240= *Bacterium*; ZF0002333= *Rhodococcus erythropolis*; ZF0003713= *Micromonospora*; ZF0004980= *Streptomyces*; ZF0004821= *Actinomyces*; ZF0002359= *Actinoplanes ianthinogenes*; ZF0002396= *Actinoplanes*; ZF0003781= *Actinomyces*; ZF0003512= *Actinomyces*; ZF0006093= *Streptomyces*; ZF0006103= *Streptomyces*; ZF0006087= *Streptomyces*; ZF0050446= *Bacterium*; ZF0050445= *Bacterium*; ZF0006086= *Streptomyces*; ZF0002322= *Rhodococcus*; ZF0003538= *Actinomyces*; ZF0003535= *Actinomyces*;

<400> 44

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25 ggccacgaag gcgcgggcat agtggagaaa gtcggccccc gcgtgcgaga cgtcgaggta
120

30 ggcgatcacg tcgtcctctc cttcattccc tcgtgtggac gctgccgttg gtgcgcagtc
180

ggacagagca acctctgcga cctcggcgcc attctgatgg ccggcgcacg ggtcgacggg
240

35 acgtaccgcg cgacagctcg cgggcacgac gtcgga
276

<210> 45

40 <211> 276

<212> DNA

45 <213> unknown

<220>

<221> source

50 <223> ZF0002326= *Actinoplanes missouriensis*; ZF0003505= *Streptomyces*;
ZF0051321= *Bacterium*; ZF0050782= *Lactobacillus bulgaricus*;
ZF0050544= *Phyllobacterium rubiacearum*; ZF0002031= *Streptomyces*;
ZF0002349= *Streptomyces spectabilis*; ZF0002434= *Streptomyces*;
ZF0050993= *Kocuria*; ZF0002018= *Streptomyces*;
ZF0003767= *Actinomyces*; ZF0003764= *Streptomyces*; ZF0002331= *Actinoplanes philippensis*; ZF0002441= *Streptomyces*;
ZF0051307= *Bacterium*; ZF0051301= *Bacterium*; ZF0051240= *Bacterium*; ZF0002333= *Rhodococcus erythropolis*; ZF0003713= *Micromonospora*; ZF0004980= *Streptomyces*; ZF0004821=

Actinomyces; ZF0002359= Actinoplanes ianthinogenes; ZF0002396= Actinoplanes; ZF0003781= Actinomyces; ZF0003512= Actinomyces; ZF0006093= Streptomyces; ZF0006103= Streptomyces; ZF0006087= Streptomyces; ZF0050446= Bacterium; ZF0050445= Bacterium; 5 ZF0006086= Streptomyces; ZF0002322= Rhodococcus; ZF0003538= Actinomyces; ZF0003535= Actinomyces;

<400> 45
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60 ggccacgaag gcgcgggcat agtggagaaa gtcggccccc gcgtgcgaga cgtcgaggta
120
15 ggcgatcacg tcgtcctctc cttcattccc tcgtgtggac gctgccgttg gtgcgcagtc
180
20 ggacagagca acctctgcga cctcggcgcc attctgatgg ccggcgcaca ggtcgacggg
240
25 acgtaccgcg cgacagctcg cgggcacgac gtcgga
276
<210> 46
279
<212> DNA
280 <213> unknown
30
<220>
35 <221> source
<223> ZF0050310= Arthrobacter paraffineus
<400> 46
60 tgccacacag atctgttac gaagtcggtg ctaccggaaa ggctcggccc ctgcgtgttc
40 gggcacgaag gagcgggggt ggtcgaggcc gtcggctcgt cgatcgacag cattgcgccc
120
45 ggtgatcacg ttttgctgag ctaccgcagt tgcgggtgt gcaggcagtg cctcagcggt
180
240 catcgccgt actgcgaaag ctcacacggg ctcaacagct ctggcgcacg caccgacggc
50 tgcacgcccgg tccggcgaag cggaaactccg atacggtcc
279
<210> 47
55 <211> 279
<212> DNA
<213> unknown

<220>

5 <221> source
 <223> ZF0002333= Rhodococcus erythropolis

10 <400> 47
 tgcatactg atctgttac acgacggta ctaccggaaa agctcggttcc
 60
 ggacacgaag gcgcggcgt cgtcaagcc gttggctcgt cgatcgacaa catcgccgt
 120
 ggtgatcag tattgcttag ctaccgcgt tgccgttat gcaggcaatg tctcagcgac
 180
 catcgccgt actgcgaaag ctcacacggg ctcaacagct ctggcgcacg caccgacggc
 240

20 tcgacgcccgg tccggcgaaa cggaaactccg atacggtcc
 279

25 <210> 48
 <211> 360

30 <212> DNA
 <213> unknown

35 <220>
 <221> source
 <223> ZF0051303= Bacterium; ZF0051337= Methyloimonas; ZF0002862= Streptomyces clavuligerus; ZF0050292= Bacterium; ZF0051305= Bacterium; ZF0003513= Actinomyces; ZF0002351= Nomonuraea roseoviolacea; ZF0003769= Actinomyces; ZF0002017= Streptomyces; ZF0051306= Bacterium; ZF0002016= Streptomyces; ZF0003504= Actinomyces; ZF0006073= Streptomyces; ZF0003770= Actinomyces; ZF0002352= Actinoplanes italicus; ZF0002378= Streptomyces aureomonopodiales; ZF0006089= Streptomyces; ZF0006106= Streptomyces; ZF0051325= Bacterium; ZF0006108= Streptomyces; ZF0002440= Streptomyces; ZF0051302= Bacterium; ZF0003532= Actinomyces; ZF0003548= Nocardiaform;

45 <400> 48
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 60

50 cacctcggtcc tcgggcacga atcgctgggc cgagtacgca cggcgccccga cggcagcggt
 120

55 ttcggccggcgt gtatctcggt cgtcggttgc gtgcgcaggc ccgatccgggt gcccgtgcggg
 180
 gcgtgtgcgc acggtgagtt cgacatgtgc cgcaacgggt agtacgtcga gcgccggatc
 240

aagcagatcg acgggtacgg gtcgacgtcg tgggtggtgg acgcccacta cacggtaag
300

ctggaccgg cgctcaccga ggtgggtgtg ctgatggaac cgacgacggt gcttggccaa
5 360

<210> 49

10 <211> 421

<212> DNA

15 <213> unknown

15 <220>

<221> source

20 <223> ZF0051303= Bacterium; ZF0051337= Methyloimonas; ZF0002862= Streptomyces clavuligerus; ZF0050292= Bacterium; ZF0051305= Bacterium; ZF0003513= Actinomyces; ZF0002351= Nomonuraea roseoviolacea; ZF0003769= Actinomyces; ZF0002017= Streptomyces; ZF0051306= Bacterium; ZF0002016= Streptomyces; ZF0003504= Actinomyces; ZF0006073= Streptomyces; ZF0003770= Actinomyces; ZF0002352= Actinoplanes italicus; ZF0002378= Streptomyces aureomonopodiales; ZF0006089= Streptomyces; ZF0006106= Streptomyces; ZF0051325= Bacterium; ZF0006108= Streptomyces; ZF0002440= Streptomyces; ZF0051302= Bacterium; ZF0003532= Actinomyces; ZF0003548= Nocardiaform;

30

<400> 49

tgtggtacgg acctgcacat ccggtcctgg gacggatggg cgcagaagac catgccacc
60

35

ccgctcacgc tcggccacga gttcgtcggc gaggtcgtcg agaccggccg cgacgtgacc
120

gacatccagg tcggcgacct ggtcagcggc gagggccacc tggtctgcgg caagtgcgc
180

40

aactgcctgg ccggccgccc tcacctgtgc cgccgcgaccg tcggcctcgg tgtcggccgt
240

45

gacggcgccct tcgcccagta cgtggtgctg cccgcctcca acgtgtgggt gcaccgggtg
300

ccggtcgacc tcgacgtcgc cgccatcttc gacccgttcg gcaacgcggt gcacaccgcg
360

50

ctctccttcc cgctcgtcgg cgaggacgtg ctggtcacccg gtgccggtagtac catcgccatc
420

t
421

55 <210> 50

<211> 414

5 <212> DNA
 <213> unknown
<220>
10 <221> source
 <223> ZF0050197= *Pseudomonas oleovorans*; ZF0050294= *Rhodococcus*;
 ZF0050330= *Bacillus*, ZF0002852= *Rhodococcus*; ZF0050310=
 Arthrobacter paraffineus; ZF0002437= *Streptomyces*; ZF0003712=
 Micromonospora; ZF0003765= *Streptomyces*; ZF0002332=
 Streptomyces diatsatochromogenes; ZF0003768= *Actinomyces*;
 ZF0002379= *Streptomyces coelescens*; ZF0002443= *Streptomyces*;
15 ZF0002442= *Streptomyces*; ZF0002436= *Streptomyces*; ZF0050994=
 Bacterium; ZF0050992= *Bacterium*; ZF0050442= *Bacterium*;
 ZF0002049= *Streptomyces*; ZF0006069= *Streptomyces*; ZF0006075=
 Streptomyces; ZF0004724= *Nocardiaform*; ZF0002392= *Actinoplanes*
 nipponensis; ZF0002356= *Actinoplanes brasiliensis*; ZF0003501=
20 *Actinomyces*; ZF0051322= *Bacterium*; ZF0006078= *Streptomyces*;
 ZF0006092= *Streptomyces*; ZF0006090= *Streptomyces*; ZF0006084=
 Streptomyces; ZF0006068= *Streptomyces*; ZF0050284= *Rhodococcus*;
 ZF0050028= *Agrobacterium tumefaciens*; ZF0003540= *Actinomyces*;
 ZF0003528= *Actinomyces*; ZF0003529= *Actinomyces*;
25 <400> 50
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 60
30 ggttaccgcg agggccaacg cgtgatcgcc ggccgcgatct gccccaaactt caattcgtat
 120
 gccgcgcagg atggcgcgcc gtcgcaggat ggcagctacc tggtgccag cggcgcatgc
 180
35 ggctgccatg gataccgggc cacggccggc tggcgctttg gcaacatcat ccatggcgcc
 240
 caggccgaat acctgctggc tcccgatgcg cagggcaatc tggcgccggt tccggacaac
40 300
 ctgagcgatg aacaggtgct gatgtgccc gacatcatgt ccaccggctt caaaggcgca
 360
45 gagaacgcac acatccgcac cggcgacacg gtggcggtat ttgcgcaggg acca
 414
50 <210> 51
 <211> 432
 <212> DNA
55 <213> unknown
 <220>
 <221> source

<223> ZF0050197= *Pseudomonas oleovorans*; ZF0050294= *Rhodococcus*;
 ZF0050330= *Bacillus*, ZF0002852= *Rhodococcus*; ZF0050310=
 5 *Arthrobacter paraffineus*; ZF0002437= *Streptomyces*; ZF0003712= *Micromonospora*; ZF0003765= *Streptomyces*; ZF0002332= *Streptomyces diatsatochromogenes*; ZF0003768= *Actinomyces*;
 ZF0002379= *Streptomyces coelescens*; ZF0002443= *Streptomyces*;
 ZF0002442= *Streptomyces*; ZF0002436= *Streptomyces*; ZF0050994= *Bacterium*; ZF0050992= *Bacterium*; ZF0050442= *Bacterium*;
 10 ZF0002049= *Streptomyces*; ZF0006069= *Streptomyces*; ZF0006075= *Streptomyces*; ZF0004724= *Nocardiaform*; ZF0002392= *Actinoplanes nippensis*; ZF0002356= *Actinoplanes brasiliensis*; ZF0003501= *Actinomyces*; ZF0051322= *Bacterium*; ZF0006078= *Streptomyces*;
 15 ZF0006092= *Streptomyces*; ZF0006090= *Streptomyces*; ZF0006084= *Streptomyces*; ZF0006068= *Streptomyces*; ZF0050284= *Rhodococcus*; ZF0050028= *Agrobacterium tumefaciens*; ZF0003540= *Actinomyces*; ZF0003528= *Actinomyces*; ZF0003529= *Actinomyces*;

 <400> 51
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 20 60

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 120

 25 cccggcgatc gcgtgctcggt ctcgtgtgtc accgcattgcg gtacgtgccg gttctgcccgc
 180

 gagagccgct acgggcaatg cctcggaggc ggcggctgga tcctcggaca cctgatcgac
 240
 30 ggcacccagg ccgaactcggt ccgagttccg tacgcccaca attcgaccaccc cccgcattcccc
 300

 35 gacgggtgtga gcgacgagca gatgctcatg ctcgcccaca tcctgcccac ctcctacgag
 360

 gtcgggtttc tcaacggctg tctccggccg gcgacgtcg tcgtcatcat cggggccgac
 420

 40 gatcgccctc tt
 432

 <210> 52
 45 <211> 220

 <212> DNA

 50 <213> unknown

 <220>

 <221> source
 55 <223> ZF0050310= *Arthrobacter paraffineus*

 <400> 52
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 60

tcacgagcgc gtcacgtccg agattcagct caacatcgcc acgctggtcg agctgacaca
120

5 cacattcccg cccgacacctc tcaccggccg cggagcactg gtcaacatcg ccagcacagc
180

gtcggtccag ccgacaccgg gcatggccgt ctactgcgc
220

10 <210> 53

<211> 226

15 <212> DNA

<213> unknown

20 <220>

<221> source

<223> ZF0050310= *Arthrobacter paraffineus*

25 <400> 53

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60

tctcgagcgc gtcacgtccg agattcagct caacatcgcc acgctggtcg agctgacaca
30 120

cacattcctg cccgacacctc tcaccggccg cggagcactg gtcaacatcg ccagcacagc
180

35 gtcgttccag ccgacaccgg gcatggccgt ctactgcgc accaag
226

40 <210> 54

<211> 237

<212> DNA

45 <213> unknown

<220>

<221> source

50 <223> ZF0003535= *Actinomyces*

<400> 54

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55 accccccggcgg attttgagcg catcctgcgg gtgaacctga ccggcgtctt caacctgagc
120

caagccgtca ttcccttgat gattcagcgc ggcggaggaa gcatcgctc gatttcctcg
180

ctgtcggcgc agaacggcgg gggatcttc ggcggcgcggc actattgcgc aaccaag
5 237

<210> 55

10 <211> 229

<212> DNA

<213> unknown
15 <220>

<221> source
<223> ZF0003535= Actinomyces
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60

25 gccgctaaag gactggcaga ccatggtgaa caccaacatc accggtctac tgaacatcac
120

ccaccatctc ctgccgacac tgatcgaccg taaaggtatc gtcgtcaacc tttcgctgt
180

30 tgccgcgcac tatccctata cggcggcaa tgtatactgc gcctccaag
229

35 <210> 56

<211> 216

<212> DNA
40 <213> unknown

<220>

45 <221> source
<223> ZF0050310= Arthrobacter paraffineus

<400> 56
caggggatcg gatacgccac cgcgaaagcgg ctgatcagcc tgggtgcgac ggtcgcgatc
50 60

ggcgacatcg acgaagccac tctcgcgca gcagccaagg atttggcat ccgcacgttc
120

55 gggcgccctcg acgtcaccga ccccgccctcg ttcttcgact tcctcgacac cgtcgaaggt
180

gaactcggcc cgatcgacgt gctgatcaac aacgcg
216

100
10 <210> 57
5 <211> 225
15 <212> DNA
20 <213> unknown
10 <220>
15 <221> source
<223> ZF0080310= Arthrobacter paraffineus
20 <400> 57
cagcggatcg ggctcgaaat tgcgcgcacc ttcatcaagg aaggcgcgac cgtcggtc
60
25 ggcgacatca acgaaaccgt gggAACGGCT gcggTCGCCG aactcggtgg agagtcggc
120
gcccgttgc cttcctgcga cgtgcgtgac tccggacagg tcgaggccat gctcgatctg
180
30 <210> 58
30 <211> 216
35 <212> DNA
40 <213> unknown
35 <220>
40 <221> source
<223> ZF0080310= Arthrobacter paraffineus
45 <400> 58
caggggatcg gctaccagac cgcaaggag ctgatccgac gaggtcacccg cgtggccatc
60
50 ggcgacatcg acgaggcacg tgctaaggag accgcccgg aactgggggt taaggttgc
120
55 acccgccctcg atgtcaccga ccctgactcg ttcaaagact ttctcgacct agtcgaggga
180
gacctcgccc ccctcgacgt gctgatcaac aacgac
216
55 <210> 59
55 <211> 222

<212> DNA
<213> unknown
5 <220>
<221> source
<223> ZF0080310= *Arthrobacter paraffineus*
10 <400> 59
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60
15 gacatcaacg aaaccgtggg aacggctgctg gtcgcccgaac tcggtgagaa gtcggctcgcc
120
cgttgcgtt cctgcgacgt gcgtgactcc ggacaggtcg aggccatgct cgatctggcc
180
20 gaaagcgctt tcggtccagt cgatgtcatc gtgaacaacg cg
222
<210> 60
25 <211> 222
<212> DNA
<213> unknown
30 <220>
<221> source
<223> ZF0080310= *Arthrobacter paraffineus*
35 <400> 60
atcgggctcg aaattgcgcg cacccttcatc aaggaaggcg cgaccgtcg tctcgccgac
60
40 atcaacgaaa ccgtggaaac ggctgcggtc ggcgaactcg gtggagagtc ggtcgcccgat
120
ttcgcttcct gcgacgtcg tgactccgga caggtcgagg ccatgctcga tctggccgaa
180
45 agcgcttcg gtccagtcga tgtcatggtc aacaacgcccgc
222
50 <210> 61
<211> 186
<212> DNA
55 <213> unknown
<220>
<221> source

<223> ZF0002333= Rhodococcus erythropolis

<400> 61
5 gtgccggtcg cggtcggtga cttcacatc gaaagtgcac aggagaccgt cgcaactatc
60
gaatcgcagt acggcacacc cgcgctcgcc cttgaggccg atgtgcgcga ccgcggcc
120

10 gtgagcgccg ctttcgaagc caccgtcgcc gaatggggac gcttcgacta cctcgtaac
180
aacgcc
186
15
<210> 62
<211> 222
20 <212> DNA
<213> unknown

<220>
25 <221> source
<223> ZF0002333= Rhodococcus erythropolis .

<400> 62
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60
ctcgatcccg aacctgccc tcagaccgag cgcgatata aagccacagg tggacaggct
120
35 gtctcgtcg tcggctccgt tgccgaggac gggttcgccg aacgcttcgt gaacactgcc
180
gtcgaatcat tcggcggact cgacgtcatg gtgaacaacg cg
40 222

<210> 63
45 <211> 231
<212> DNA
<213> unknown
50 <220>

<221> source
<223> ZF0002333= Rhodococcus erythropolis
55 <400> 63
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60

gtcgccaggc gggcagatcg cctcgaagcc ctgcgttaccg aactccgcgt cgcccacggc
120

atcacagtca cagttctgcc tgccgacctg gcggcgcccg gcgtcggcgc aacactgcac
5 180

caggagctga caagccgtgg catcaccgtc acctcgctga tcaacaacgc c
231

10 <210> 64

<211> 216

15 <212> DNA

<213> unknown

<220>

20 <221> source
<223> ZF0003535= *Actinomyces*

<400> 64

25 ccagcggacg gctatcagac agcgaaggag ttgattcgac gaggccaccg ggtcgccatc
60

gtcgacatcg acgaggcacg tgcgaagggg gccgcccgg aactcgggtt gaaggtcgtc
120

30 acccgactcg acgtcaccga acctgactcg ttcacaacgt ttctggacct ggtcgaacgt
180

gaactcggac ccctcgacat cctggtcaac aacgct
35 216

<210> 65

40 <211> 201

<212> DNA

<213> unknown

45 <220>

<221> source
<223> ZF0050310= *Arthrobacter paraffineus*

50 <400> 65

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60

55 gtcgcactta tcgaatcgca gtacggcaca cccgcgtcg cccttgaggc cgatgtgcgc
120

gaccgcgcgg ccgtgagcgc cgcttcgaa gccaccgtcg ccgaatgggg acgcttcgac
180

5 tacctcgta acaacgcccc c
201

10 5 <210> 66
 <211> 201
 <212> DNA
10 10 <213> unknown
 <220>

15 15 <221> source
 <223> ZF0050310= *Arthrobacter paraffineus*
 <400> 66
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 60
 gtcgcactta tcgaatcgca gtacggcaca cccgcgctcg cccttgaggc cgatgtgcgc
 120

25 25 gaccgcgccc ccgtgagcgc cgcttcgaa gccaccgtcg ccgaatgggg acgcttcgac
 180
 30 tacctcgta acaacgcccc c
 201
 35 <210> 67
 <211> 1047
 <212> DNA
 <213> unknown

40 40 <220>
 <221> source
 <223> ZF0050310= *Arthrobacter paraffineus*

45 45 <400> 67
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 60
 50 cccgagcccg gtccaggtga agtgctcctg gaagtcacccg ctgccggcgt ctgccactcg
 120
 gacgacttca tcatgaggct gcccgaagag cagtcacacct acggccttcc ttcacgctc
 180

55 55 ggccacgaag gcgccggccg ggtcgccgccc gtcggcgagg gcttcgaagg actcgacatc
 240
 ggaaccaatg tcgtcggtcta cggaccctgg ggctgtggca gctgtggca ctgctcgaa
 300

ggactcgaaa actactgttc tcgggcaaaa gaactcgca tcaatcctcc tggtctcggt
360

gcacccggcg cgttggccga attcatgatc gtcgattcac ctcgccacct cgtcccgatc
5 420

ggcgacctcg atccggtcaa gacggtgcca ctgaccgacg ccggtctgac tccgtatcac
480

10 gcgatcaagc gttcactgcc gaaacttcgc ggtggcgcgt acgccgtcgt catcggtacc
540

ggcggtctcg gccatgtcgc catccaactc ctccgccacc tctcggcagc aaccgtcatc
600

15 gcactcgacg tgagcgcgga caagctcgaa ctggcaacca aggtaggcgc tcacgaagtg
660

gtcctgtccg acaaggacgc gcccggagaac gtccgcagga tcaccggaag tcagggcgcc
20 720

gcactggttc tcgacttcgt cggctatcag cccaccatcg acaccgcgt ggctgtcgcc
780

ggcgtcgat cggacgtcac gatcgtcggt atcggcgacg ggcaggccca tgccaaagtc
25 840

gggttcttcc aaagtcccta cgaggcttct gtgacagttc cgtactgggg tgcccgcaac
900

30 gagctgatcg aattgatcga cctggcgac gccggcatct tcgacatcgc ggtggagacc
960

ttcagtctcg acaacggcgc cgaagcgtat cgacgactgg ccgcccggaaac gctcagcgcc
1020

35 cgcgcggttg tggccctgg tctgtag
1047

40 <210> 68

<211> 1047

<212> DNA

45 <213> unknown

<220>

50 <221> source
<223> ZF0050310= Arthrobacter paraffineus

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55 60

cccgagcccg gtccaggta agtgctcctg gaagtcacccg ctgcccggcgt ctgccactcg
120

gacgacttca tcatgaggct gcccgaagag cagtacacct acggcttcc tctcacgctc
180
5 ggccacgaag gcgcggccg ggtcgccgccc gtcggcgagg gcgtcgaagg actcgacatc
240
ggaaccaatg tcgtcgctca cggaccctgg ggctgtggca gctgttggca ctgctcgcaa
300
10 ggactcgaaa actactgttc tcgggcaaaa gaactcggca tcaatcctcc tggtctcggt
360
15 gcacccggcg cggtggccga attcatgatc gtcgattcac ctcgccaccc cgtcccgatc
420
ggcgcacctcg atccggtcaa gacggtgcca ctgaccgacg ccggtctgac tccgtatcac
480
20 gcgatcaagc gttcactgcc gaaacttcgc ggtggcggt acgcccgtcgat catcggtacc
540
ggcggtctcg gccatgtcgc catccaactc ctccgccacc tctcggcagc aaccgtcatc
600
25 gcactcgacg tgagcgcgga caagctcgaa ctggcaacca aggtaggcgc tcacgaagt
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gtcctgtccg acaaggacgc ggccgagaac gtccgcagga tcaccggaag tcagggcgcc
720
30 gcactggttc tcgacttcgt cggctatcag cccaccatcg acaccgcgt ggctgtcgcc
780
ggcgtcgat cggacgtcac gatcgctggg atcggcgacg ggcaggccca tgccaaagtc
840
35 gggttttcc aaagtctta cgaggcttct gtgacagttc cgtactgggg tgcccgcaac
900
40 gagctgatcg aattgatcga cctggcgac gccggcatct tcgacatcgc ggtggagacc
960
ttcagtctcg acaacggcgc cgaaggctat cgacgactgg ccgcggaaac gtcagcgcc
1020
45 cgcgcggttg tggccctgg tctgtag